

WHAT IS CLAIMED IS:

1 1. A method for determining the validity of a sensor signal including the
 2 steps of:
 3 providing a sensor signal from a sensor;
 4 providing an estimated sensor signal;
 5 determining the difference between the sensor signal and the estimated
 6 sensor signal;
 7 calculating a standard deviation of the difference;
 8 scaling the points of inflection of a fuzzy logic membership function
 9 proportional to the standard deviation; and
 10 processing the sensor signal using the fuzzy logic membership function
 11 to determine whether the sensor signal is valid or not.

1 2. The method of Claim 1, wherein the step of processing occurs before
 2 the step of scaling.

1 3. The method of Claim 1, wherein the step of scaling occurs before the
 2 step of processing.

1 4. The method of Claim 1, wherein the fuzzy logic membership function
 2 has at least two domains, including at least one domain that evaluates a sensor signal
 3 as acceptable, and at least one domain that evaluates a sensor signal as unacceptable.

1 5. The method of Claim 4, wherein the step of scaling includes the step of
 2 multiplying a plurality of points of inflection of the fuzzy logic membership function
 3 by the standard deviation.

1 6. A method for determining the quality of a sensor signal in a fuzzy
 2 logic controller including the steps of:
 3 providing a first cumulative scatter value indicative of a cumulative
 4 degree of difference between a plurality of sensor signal values and estimated sensor
 5 signal values corresponding to each of the sensor signal values;
 6 providing a fuzzy logic membership function in which the x-axis

7 values of the points of inflection of a plurality of fuzzy logic domains are derived
 8 from the first cumulative scatter value;
 9 retrieving a further sensor signal value;
 10 comparing the further sensor signal value with a further estimated
 11 sensor signal value;
 12 calculating a further scatter value indicative of the individual degree of
 13 difference between the further sensor signal value and the further estimated sensor
 14 signal value;
 15 combining the further scatter value with the first cumulative scatter
 16 value to provide a second cumulative scatter value indicative of the cumulative degree
 17 of difference and the individual degree of difference in combination; and
 18 amending the fuzzy logic membership function such that the x-axis
 19 values of the points of inflection of the plurality of fuzzy logic domains are derived
 20 from the second cumulative scatter value.

1 7. The method of Claim 6, wherein the step of providing a first
 2 cumulative value includes the steps of:
 3 a. calculating a first difference between a first of the plurality of
 4 sensor signal values and a first of the estimated sensor signal values;
 5 b. calculating a second difference between a second of the
 6 plurality of sensor signal values and a second of the estimated sensor signal values;
 7 and
 8 c. calculating the first cumulative scatter value from at least the
 9 foregoing first and second differences.

1 8. The method of Claim 7, wherein the first cumulative scatter value is a
 2 function of the standard deviation of the first and second differences.

1 9. A method of individually determining whether a plurality of sequential
 2 sensor values are valid comprising the steps of:
 3 a. reading a sensor value;
 4 b. determining a degree of difference between the sensor value
 5 and an estimated sensor value;

- 6 c. revising the x-axis values of a fuzzy logic membership function
 7 that responds to the degree of difference as an input and produces a signal indicative
 8 of the validity of the sensor value as an output;
 9 d. determining whether the sensor value is valid; and
 10 e. repeating steps a through d for each of the plurality of
 11 sequential sensor values.

1 10. The method of Claim 9, further comprising the steps of:
 2 calculating a value indicative of the collective degree of scatter of the
 3 individual degree of differences calculated in step c.

1 11. The method of Claim 10, wherein the step of calculating is performed
 2 after each step of determining a degree of difference, and wherein the value indicative
 3 of the collective degree of scatter incorporates all of the previous individual degrees
 4 of difference.

1 12. The method of Claim 11, wherein the value indicative of the collective
 2 degree of scatter is a standard deviation of prior degrees of difference calculated in
 3 step b.

1 13. The method of Claim 12, wherein x-axis values of the membership
 2 function are themselves functions of the standard deviation.

1 14. The method of Claim 13, further comprising the step of calculating a
 2 plurality of the x-axis values every time the step of calculating a value indicative of
 3 the degree of scatter occurs.

1 15. The method of Claim 14, wherein each of the x-axis values of the
 2 points of inflection are associated with a value that is a function of the collective
 3 degree of scatter.